REMARKS

I. The Pending Claims and the Amendments to the Claims

With the entry of the above amendment, Claims 1-19 and 21-24 are pending. Claim 12 is withdrawn from consideration as directed to a non-elected species. Claim 20 stands canceled. Independent Claims 1 and 24 have been amended by the addition of the recitation that the added liquid comprises brine, i.e., the feature recited in canceled Claim 20. Support for this amendment can be found in Applicants' specification at, for example, Page 5 line 13. Dependent Claims 13 and 14 are amended in a manner to correct a lack of antecedent basis for the word "film". Support for this amendment can be found in the specification at, for example, Page 5 line 1. New Claim 25 recites the product as a fresh meat product, with the atmosphere having been evacuated between the package and the fresh meat, and the package comprises a film which has been shrunk against the fresh meat. Support for Claim 25 can be found in the specification at, for example, Page 23 lines 3-8 in combination with Page 22 lines 11-15. Claim 26 is directed to the packaged product of Claim 25 wherein the package is made from an end-seal bag. Support for this claim can be found in Applicants' specification at, for example, Page 23 lines 20-24. Claim 27 is directed to the packaged product of Claim 25 wherein the package is made from a side-seal bag. Support for this claim can be found in Applicants' specification at, for example, Page 23 lines 1-4. The amendments to the claims include no new matter.

II. The Rejection of Claims 1-11 and 13-24 as Obvious over LUTHRA et al in view of NOEL

On Page 2 of the 29 March Office Action, Claims 1-11 and 13-24 are rejected under 35 USC 103(a) as unpatentable over WO99/00250 to Luthra, et al ("LUTHRA et al") in view of U.S. Patent No. 6,355,287 to Noel et al ("NOEL et al").

In response, Applicants first note that each of independent Claims 1 and 24 have been amended to recite the added liquid as comprising brine. Applicants acknowledge that LUTHRA et al discloses the packaging of a liquid-containing product (e.g., "moist products", see Abstract of LUTHRA et al; "whole and cut produce", Page 1 line 7 of LUTHRA et al; "fresh red meat", Page 19 line 19 of LUTHRA et al), and that LUTHRA discloses a seal layer containing a slip agent (e.g., see Page 2 lines 24-26 of LUTHRA et al. "...heat sealable layer coated with...slip agent...."). Applicants further note that LUTHRA et al is directed particularly to a fog-resistant packaging film.

While Page 3 of the Office Action states that LUTHRA et al differs from Applicants' Claim 1 only in the recitation that the liquid is "added", and that where the liquid has come from is irrelevant once the liquid is in the package, Applicants point out that the addition of liquid to the product increases the level of liquid above the natural level existing in the product. This increase in the amount of liquid in the product, in turn, can increase the level of liquid contamination which must be sealed through upon placing the product in the package. Moreover, as amended, Claim 1 recites the added liquid as comprising brine. Thus, both the amount and type of liquid which must be sealed through are different from the amount and type of liquid disclosed in LUTHRA et al.

Turning to NOEL et al, Applicants acknowledge that NOEL et al discloses the packaging of a product having an added liquid. See Abstract of NOEL et al. Applicants further acknowledge that NOEL et al discloses that the added liquid can comprise brine. Again, see Abstract of NOEL et al. Thus, unlike LUTHRA et al, NOEL et al is dealing with the same seal area contamination problem which Applicants' invention addresses. The problem is exemplified by weak seals when sealing through the amount and type of seal area contamination which occurs when packaging products containing added liquid which comprises brine. This is clear from both NOEL et al as well as from Applicants' specification. See, for example, the Background of the Invention in Applicants' specification as well as the Background of the Invention in NOEL et al. In contrast, LUTHRA et al does not disclose this kind of sealing environment.

It should be noted that NOEL et al does not teach or suggest that a slip agent be included in the seal layer of the package.[1] Typical slip agents, such as fatty amides, are of a waxy nature. Applicants propose that one of ordinary skill in the art would not be motivated to include a slip agent in the seal layer of a package to be used in an environment in which an added liquid comprising brine is present in a product capable of contaminating the seal area with the added liquid. Those of ordinary skill in the art recognize that slip agents have the ability to detrimentally affect sealing. As evidence of this, Applicants direct attention to Exhibit A, Handbook of Polyethylene, Pages 497-498, which states:

> Other factors that may detrimentally affect sealing include blooming of additives to the surface and chemical surface modification such as corona treatment.

---

[1] Although Col 23 lines 26-33 of NOEL et al discloses that the polymer components used to fabricate films can include appropriate amounts of additives which include slip agents such as talc, antioxidants, fillers, dyes, pigments, radiation stabilizers, antistatic agents, elastomers and the like additives known to those of skill in the art, NOEL et al contains no teaching or suggestion to place a slip agent *in the seal layer* of the package in an environment in which the seal layer will be exposed to contamination from a food product containing an added liquid comprising brine.

Slip agents are known to be additives which have the ability to bloom to the surface of the film, and thereby detrimentally affect sealing. Thus, one of ordinary skill in the art would not be inclined to utilize a slip agent in the seal layer of a package being utilized to package a food product having an added liquid comprising brine.

Applicants contend that based on the above arguments and evidence, LUTHRA et al in view of NOEL et al does not establish a prima facie case of obviousness of any one or more of Claims 1-11, 13-19, and 21-24. A prima facie case of obviousness has not be set forth because one of ordinary skill in the art would not have provided the seal layer with a slip agent for sealing around a product containing an added liquid comprising brine, as one of ordinary skill in the art would have realized that the slip agent could have a detrimental result on sealing, rather than an advantageous result on sealing.

Moreover, even if a prima facie case of obviousness has been established, which is not the case, Applicants contend that the specification of their application sets forth evidence of unexpected results. More particularly, Applicants direct attention to the results presented in Table 4 on Page 34, more particularly a comparison of total leaks (%) for Example 1 (an example of the invention, with a slip agent in the seal layer) versus total leaks (%) for Example A (comparative, otherwise in accordance with NOEL et al, with no slip or surfactant in the seal layer). Table 4 indicates that total leaks was 72% for the invention versus 78% for the control.

In Table 6, a comparison of Example 1 (i.e., the invention) versus Example C (a comparative), shows burst pressure of 2.2psi for the package of the invention versus only 1.3 psi

for the control package. Both Example C and Example 1 contained the same 0.904 g/cc resin in the seal layer, but Example 1 further contained slip agent while Example C contained no slip agent.

In Table 8, a comparison of Example 1 (i.e., the invention) versus Example E (a comparative), shows a contaminated burst pressure of 2.1psi for the package of the invention versus only 1.7 psi for the control package. Both Example E and Example 1 contained the same 0.904 g/cc resin in the seal layer, but Example 1 further contained slip agent while Example E contained no slip agent.

In Table 9, a comparison of Examples 10, 11, 12, 13, and 14 (i.e., the invention) versus Example F (a comparative), shows contaminated burst pressures of 2.0, 2.0, 2.3, 1.9, and 1.9 psi, respectively, versus 1.7 psi for Example F, which contained no slip agent.

In Table 10, a comparison of Example 15 (i.e., the invention) versus Example G (a comparative), shows a contaminated burst pressure of 1.6 psi for the invention versus only 0.9 psi for the comparative.

In Table 11, a comparison of Example 16 (i.e., the invention) versus Example H (a comparative), shows a contaminated burst pressure of 1.9 psi for the invention versus only 1.0 psi for the comparative.

Applicants contend that the results set forth in Tables 6, 8, 9, 10, and 11 are a demonstration of unexpected results. Using the same or similar films, the presence of the slip agent would have been thought to decrease the seal strength in sealing through brine contamination. In fact, however, the result was just the opposite. The presence of the slip agent was discovered to increase the seal strength when sealing through brine contamination. Applicants

contend that these results serve to overcome any prima facie case of obviousness which may have been made out by LUTHRA et al in view of NOEL et al.

III. The 35 USC §112 Rejection of Claim 24

On Page 4 of the 29 March Office Action, Claim 24 is rejected under 35 USC 112, first paragraph. The Office Action states that the specification does not support a claim where neither a slip agent nor a surfactant are present in the seal layer of the seal layer.

In response, Applicants note that Claim 24 recites the seal layer as having a surface energy of 28 dynes/cm or less, or at least 32 dynes/cm. Thus, Claim 24 covers seal layers having any surface energy except a surface energy of from greater than 28 dynes/cm up to less than 32 dynes/cm. Applicants note that the presence of a slip agent in the seal layer can be used to provide a relatively non-polar surface having a surface energy up to 28 dynes/cm, while the presence of a surfactant can be used to provide a relatively polar seal layer having a surface energy of at least 32 dynes/cm. Any means for obtaining a surface energy within one of the claimed ranges should suffice to achieve the advantageous sealing through brine contamination, and is in accordance with the invention as set forth in Claim 24. Thus, Claim 24 is an alternative manner of expressing Applicants' invention. It may be also be possible to obtain a surface energy of up to 28 dynes/cm through polymer modification and/or with a different additive, i.e., an additive which is not a slip agent. Likewise, it may be possible to obtain a surface energy of at least 32 dynes/cm through polymer modification and/or with an alternative additive which is not a surfactant. Applicants should not be required to disclose every possible way of obtaining their claimed invention. As

Applicants have disclosed at least one means of carrying out the invention of Claim 24, Applicants' specification should be deemed to support Claim 24.

Conclusion

Applicants respectfully request reconsideration of the patentability of Claims 1-11, 13-19, and 21-24, in view of the amendments and remarks set forth above, with a view towards allowance.

Respectfully Submitted,

Rupert B. Hurley Jr.
Rupert B. Hurley Jr.
Reg. No. 29,313
Attorney for Applicants
(864) 433-3247

30 August 2004

andbook of Polypropylene and Polypropylene Composites, edited by Har- un G. Karian
olymer Blends and Alloys, *edited by Gabriel O. Shonaike and George P. imon*
tar and Hyperbranched Polymers, *edited by Munmaya K. Mishra and Shi- Kobayashi*
ractical Extrusion Blow Molding, *edited by Samuel L. Belcher*
olymer Viscoelasticity: Stress and Strain in Practice, *Evaristo Riande, icardo Díaz-Calleja, Margarita G. Prolongo, Rosa M. Masegosa, and Cat- ina Salom*
andbook of Polycarbonate Science and Technology, *edited by Donald G. eGrand and John T. Bendler*
andbook of Polyethylene: Structures, Properties, and Applications, *Andrew Peacock*

Additional Volumes in Preparation

andbook of Polyolefins, Second Edition, Revised and Expanded, *edited Cornelia Vasile*

upramolecular Polymers, *edited by Alberto Ciferri*

olymer and Composite Rheology, Second Edition, Revised and xpanded, *edited by Rakesh K. Gupta*

andbook of Elastomers, Second Edition, Revised and Expanded, *edited Anil K. Bhowmick and Howard L. Stephens*

Exhibit A

HANDBOOK OF POLYETHYLENE

Structures, Properties, and Applications

BEST AVAILABLE COPY

ANDREW J. PEACOCK
Exxon Chemical Company
Baytown, Texas

MARCEL DEKKER, INC.   NEW YORK · BASEL

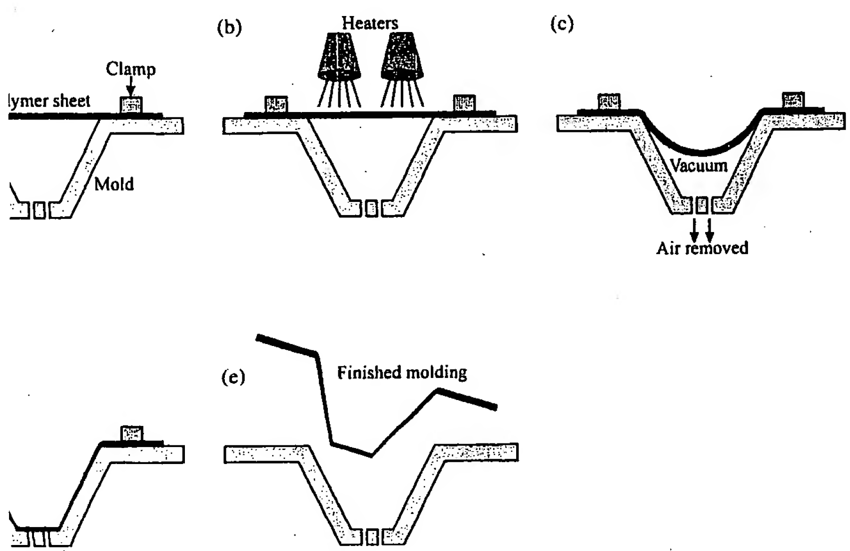
ECONDARY FABRICATION PROCESSES

hermoforming

oforming is used to convert flat polyethylene sheets into three-dimensional :. It is used to produce such items as pickup truck bed liners, agricultural ; troughs, and panels for portable sanitation facilities.

The principal steps of thermoforming are illustrated schematically in Figure the first step, a cold sheet is clamped into a frame that grips its edges. The s then heated sufficiently to soften but not melt it. The heated sheet is to conform to the shape of the mold by vacuum, pressure, or mechanical or by some combination of any two or all three of them. The shaping s maintained while the sheet solidifies. Upon removal from the mold, the t is trimmed as necessary.

The attainment of a final product with uniform wall thickness requires cor- lesigned equipment, the appropriate resin, and carefully chosen processing :ters. This is especially true when products with a deep draw are being ted. The molten sheet should have sufficient elasticity that it does not sag w unduly under its own weight, but it must be capable of being extended lesired dimensions without tearing or necking. Thus, extremes of molecu- ight are to be avoided. The precise molecular parameters required will



20 Principal steps of thermoforming. (a) Clamping; (b) heating; (c) forming; ling; (e) removal.

depend on sheet thickness, processing rates, depth of draw, and the processing temperature.

B. Bonding Techniques

The bonding of polyethylene to itself, other polymers, and nonpolymeric substrates involves raising its temperature sufficiently for most or all of the crystalline regions to melt, then holding it in position until it resolidifies. Molecular interdiffusion across the boundary or intimate surface contact creates the bond. The term ''sealing'' applies to the bonding of thin films, while ''welding'' is used to describe the bonding of thicker items such as sheet and pipes.

The very low surface energy of polyethylene prohibits the widespread use of adhesive bonding techniques. Even the adhesion of printing ink to polyethylene requires prior chemical modification of the surface by one of the techniques described in Chapter 7.

1. Sealing

The sealing of polyethylene films involves the melting and resolidification of two surfaces in intimate contact with each other. Heat can be applied externally from a heated sealing bar or generated internally by the electromagnetic excitation of **polarizable side groups. Sealing is used extensively in the field of packaging to** create bags and pouches that are used for all manner of food, medical, and general purposes. More specialized applications of heat sealing include the creation of pond liners and research balloons.

The principles of heat sealing are illustrated schematically in Figure 21. In the first step, the surfaces to be joined are brought into alignment with one another. Next, a heated sealing bar applies sufficient heat and pressure to melt the films and force their surfaces into intimate contact. The temperature, pressure, and dwell time are all carefully controlled to ensure adequate molecular diffusion

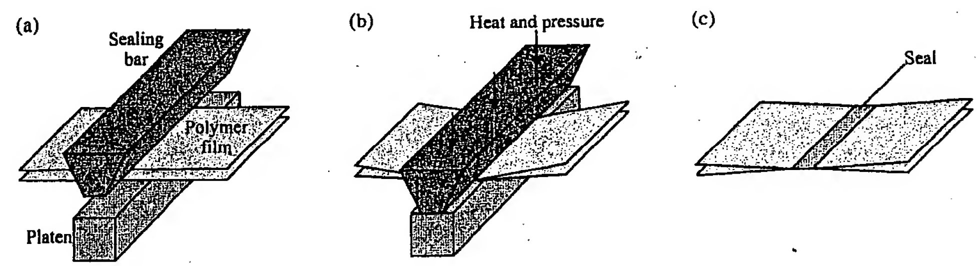


Figure 21 Schematic illustration of the heat-sealing process. (a) Polymer films aligned; (b) sealing bar applies heat and pressure; (c) seal removed from under sealing bar.

without undue oxidative degradation or excessive flow that could result in molten polymer being squeezed away from the bond. In the final step, the heat source and pressure are removed, and the bond is allowed to solidify prior to the application of load. Heat sealing is only applicable to thin films in which heat transfer into and out of both thicknesses of film is very rapid.

Sealing bars come in various shapes and sizes. In their simplest form they consist of an electrical heater within a metal bar that is covered with a nonstick coating such as polytetrafluoroethylene. Impulse heat-sealing bars support a polytetrafluoroethylene-covered nichrome wire that is momentarily pulsed with sufficient electrical current to melt the film between the sealing bar and the platen. When a continuous bond is to be created, such as the edge seal required to form a tube from a flat film, band sealers are used. In this process, metal bands apply pressure and transport the film through heating and cooling zones. The rapid rate at which polyethylene film can be sealed suit it to the requirements of modern high speed packaging processes such as vertical form, fill, and seal. When complex or prototype seals are to be created, it is possible to seal polyethylene films with the aid of a handheld iron, the use of which requires much skill if consistent bonding is to be achieved.

Internal melting of films to effect heat sealing can be accomplished by radio-frequency heating (the technique also being known as dielectric heat sealing and high frequency welding). In this process an alternating electric current (typically with a frequency of 27.12 MHz) is applied between the sealing bar and the platen, which excites polarizable groups sufficiently to raise the temperature of the polymer into its melting range. In the case of polyethylene, this technique is limited to copolymers containing polar comonomers such as vinyl acetate or methacrylic acid. During sealing, the platen and sealing bar remain cold, preventing the outer surfaces of the film, with which they make contact, from melting.

The ability to create an effective heat seal may be limited by surface contamination. During packaging operations, contents in the form of liquids or powders may adulterate the sealing surfaces, preventing interdiffusion of the polymer. Other factors that may detrimentally affect sealing include blooming of additives to the surface and chemical surface modification such as corona treatment.

2. Welding

The welding of polyethylene involves the melting of surfaces that are subsequently brought into contact. Two principal variations exist, the direct bonding of adjacent surfaces and a more traditional welding approach in which an independent bead of polyethylene heated by hot air is used to create the bond. Direct bonding is widely applied to pipes, while hot air welding is used to fabricate tanks and the like from polyethylene sheet.

a. Direct Bonding. Lengths of polyethylene pipe can be joined end to end by the techniques of butt or socket welding, and junctions can be created by saddle welding.

In butt welding (also known as butt fusion and hot plate fusion), a heated metal plate is placed between the squared and cleaned ends of adjacent lengths of pipe. Slight pressure is applied to maintain good contact between the pipe ends and the plate. After a preset time the plate is rapidly withdrawn and the molten pipe ends are brought into contact with sufficient pressure to produce intimate contact and create interior and exterior circular beads of polymer. The pressure is then reduced and the joint is allowed to solidify. In smaller pipes (up to approximately 2 ft in diameter) this process can be automated, which produces more consistent joints than can be attained manually. Control variables include temperature, dwell time, initial contact pressure, and holding force during solidification. The application of too much pressure to the molten pipe ends will result in thin bonds that are weak. Conversely, with too little pressure the interdiffusion of molecules across the interface will not be adequate.

In socket fusion the cleaned ends of adjacent lengths of pipe are inserted into a socket that is heated to create the bond. The temperature of the socket is commonly raised by the resistive heating of wires embedded within it. The applied heat melts the interior of the socket and the exterior of the pipe ends to form the weld. Socket fusion involves less melt flow than butt fusion, so it is important that the surfaces to be joined be free of contaminants such as dirt, grease, and oxidation. As such joints are frequently made outdoors, rain and blowing dust can be troublesome. This problem can be alleviated to a great extent by the use of temporary welding shelters.

b. Hot Air Welding. Hot air welding involves melting a polyethylene welding rod and the surfaces to be bonded with a hot air jet. Before welding takes place, the workpieces are clamped in the desired position, with a V-shaped gap defining the welding channel. Typically the welding rod, which may be triangular, is automatically fed concentrically through the hot air jet of the welding gun. The hot air simultaneously melts the welding rod and the surfaces to be joined. To ensure adequate joint strength the substrates must have thicknesses exceeding one 1/16 in. Naturally, the joint surfaces and that of the welding rod must be kept scrupulously clean.

V. FABRICATION AND USES OF ULTRAHIGH MOLECULAR WEIGHT POLYETHYLENE

Ultrahigh molecular weight polyethylene (MW > 1,000,000) has many desirable solid-state characteristics, including excellent abrasion resistance, high tough-